Clinical Update

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National Naval Medical Center
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Bethesda, Maryland 20889-5600

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Differentiating sinonasal cysts and cyst-like entities

Major Lisa Franklin, DC, USA, Lieutenant Commander Brenda Nelson, DC, USN,
and Commander James T. Castle, DC, USN

Introduction

Subtle variations of oral and craniofacial anatomy are commonly identified and documented as part of routine dental examinations and radiographs. One such common finding is the dome-shaped radiopaque shadow seen arising from the floor of the maxillary sinus, termed the antral pseudocyst. In the past, this entity has been inaccurately referred to as a sinus mucocele because previous investigators thought that the lesion represented mucus extravasation similar to that seen in association with the minor salivary glands of the oral mucosa.[1] True sinus mucoceles, a potentially aggressive lesion, do exist and occur under several circumstances. Another point of confusion is the sinus retention cyst, an entity of little clinical significance found in individuals with nasal polyps. While these entities may, unfortunately, share similar nomenclature, they differ in etiology, presentation and treatment. An understanding of their terminology and clinical consequences is essential to patient treatment and outcome.

Antral pseudocyst

The antral pseudocyst is a common finding in a dental practice and is most commonly seen on panoramic radiographic images. Their discovery invoke a more ominous diagnosis but these pseudocysts merely are formed by the accumulation of serum beneath the periosteum, lifting it off the bone and the floor of the sinus to form the characteristic radiographic dome-shaped structure. The term "pseudocyst" is an accurate term as these lesions differ from true cysts as they are not pathologic cavities lined by epithelium. Antral pseudocysts are relatively common and present in 1.5% to 14% of the population. While sinus inflammation, adjacent odontogenic infection, and allergies have been suspected in contributing to the development of antral pseudocysts, their etiology has yet to be definitively determined.

Microscopic examination reveals a layer of loose edematous connective tissue. The epithelial lining of the sinus is seen superior to the fluid and may be of pseudostratified, ciliated or columnar type. Additionally, a dense fibrovascular connective tissue may be identified, occasionally containing cholesterol clefts and multinucleated giant cells. Clinical history and radiographic correlation is essential to the proper diagnosis, as these tissues are microscopically similar to normal or slightly inflamed sinus mucosa.[2] Antral pseudocysts are asymptomatic, harmless and require no treatment. With experience, their diagnosis may be confidently rendered radiographically and no biopsy may be required.

Sinus mucocele

The sinus mucocele is a true cyst, lined by epithelium and containing mucinous secretions accumulated within a blocked or obstructed sinus cavity. When normal sinus drainage is blocked or with the progressive dilatation of an obstructed gland, these mucoceles can become sufficiently distended to fill the sinus. Although rare, this type of mucocele is more commonly associated with frontal sinuses. The ethmoid and sphenoid sinuses are affected less often. Sinus mucoceles are frequently recognized on the basis of their radiographic appearance. They have a number of consistent radiographic features, however none of these features is unique. The affected sinus is opacified by the entrapped mucus, which has in turn displaced all intrasinus air. Complete sinus opacification occurs when the sinus is filled with a mucoid, low-density material. The bone of the sinus is generally remodeled from the processes of inflammation, which may cause thickening and expansion, in turn leading to thinning of the sinus walls. Thickening and thinning may even be seen in the different areas of the same sinus. Often, the mucocele will be seen radiographically to have expanded or herniated into adjacent structures, particularly into the orbit or the cranial cavity. This radiographic appearance may be difficult to distinguish from a malignant lesion. Statistically the sinus mucocele is the most common expansile lesion of any paranasal sinus. The treatment for mucoceles may be roughly divided into two categories: radical surgery and conservative surgery. Radical surgery entails the complete extirpation of the mucus membrane with obliteration of the sinus cavity. Conservative surgery involves marsupialization of the mucocele with creation or preservation of adequate sinus drainage in order to minimize risk of recurrence. The advent of endoscopic sinus surgery has increased the safety and efficacy of mucoceles with a favorable outcome.[3] Although its operative and radiographic finding suggests its identity, a biopsy is required to establish the true diagnosis.[4]

Surgical ciliated cyst. The surgical ciliated cyst, or postoperative maxillary cyst, is one type of sinus mucocele that appears after trauma or surgery, most frequently a Caldwell-Luc procedure. Due to surgical manipulation, a portion of the sinus lining becomes separated from the main body of the

sinus and eventually forms an epithelial-lined cavity in which mucin accumulates.[1] Interestingly, these postoperative cysts in the maxillary sinus are more common in Japan than in North America or Europe. It has been proposed that the high prevalence of maxillary sinusitis in Japan, especially during and after World War II, was generally treated by the Caldwell-Luc procedure. This treatment approach was made common due to the lack of available antibiotics.[5]

Clinical symptoms are most commonly headaches and ophthalmologic abnormalities. The cheek may noticeably distend and if intranasal extension occurs, rhinorrhea and nasal obstruction may be noted. Displacement of maxillary teeth may also occur. All types of sinus mucoceles appear as firm, encapsulated masses that are filled with fluid that is mucinous or gelatinous and may be yellow brown, green or gray. If the fluid is purulent, the lesion is termed a pyocele. Histopathologically, the appearance is that of chronically inflamed sinus mucosa. The lining is typical respiratory epithelium of the maxillary sinus or may show squamous metaplasia. The underlying cellular connective tissue may contain foamy histiocytes, lymphocytes, cholesterol crystal clefts, hemosiderin and calcifications.[5] Surgical enucleation is the treatment of choice.

Retention cyst

Retention cysts, in contrast, are caused by blockage and subsequent dilatation of ducts of the seromucinous glands of the sinus and are consequently lined with epithelium.[5] Seromucinous glands are normally found around the ostium of the maxillary sinus, therefore retention cysts may frequently occur in this region.[6] However, these glands may proliferate throughout the sinus lining during prolonged infection and are often found in antral polyps.[2] Most retention cysts are small and are not evident clinically or radiographically. Many are found incidentally upon histopathologic examination of nasal polyps.[1] Microscopically, they are small cysts containing fluid or thick caseous material. Although the finding of nasal polyps may point to an allergic etiology, most patients with polyps do not suffer from allergies and only 0.5% of patients with allergies develop polyps.[7] Unless large and obstructive, these lesions do not require treatment.

Conclusion

Undoubtedly, dentists are very familiar with the mucous extravasation reaction that occurs within the lower lip in response to trauma. This soft tissue entity has often been referred to as a mucocele and its prevalence is quite common. Additionally, dentists are aware of the antral pseudocyst and its characteristic dome-shaped radiographic appearance. This too has been commonly referred to as a sinus mucocele, however, neither lesion is a true cyst. True sinus mucoceles, a potentially aggressive lesion with substantial morbidity, must be differentiated. Confusion has persisted regarding the variety of terms used for these entities therefore it is essential for the dental professional to understand the etiology of these lesions and, in turn, to use the proper terminology to ensure proper patient treatment.

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Major Lisa Franklin, DC, USA, is a resident in the Oral and Maxillofacial Pathology Program at the Naval Postgraduate Dental School. Lieutenant Commander Nelson is the Acting Department Head, Oral and Maxillofacial Pathology during Commander Castle's deployment in Kuwait.

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